DOCUMENT RESUME

ED 270 455 TM 860 295

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TITLE An Achievement Formula that Applies the Correlates of Effective Schools and the Recommendations of the "Excellence" Reports to Predict, Monitor, and Promote Student Achievement.
PUB DATE Apr 86
NOTE 67p.; Paper presented at the Annual Meeting of the American Educational Research Association (70th, San Francisco, CA, April 16-20, 1986).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143) -- Information Analyses (070)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Academic Achievement; Aptitude Treatment Interaction; Educational Change; Educational Improvement; Educational Needs; *Educational Quality; Educational Trends; Elementary Secondary Education; Field Tests; Higher Education; *Learning Theories; Literature Reviews; Mastery Learning; Models; *School Effectiveness; *Success; *Teacher Effectiveness; Time on Task
IDENTIFIERS *Effective Schools Research

ABSTRACT

In order to develop a formula to measure effective schooling and student achievement, a number of reports on excellence in education were reviewed: (1) The National Commission on Excellence in Education's report, "A Nation at Risk"; (2) The Education Commission of the States Task Force on Education for Economic Growth report; (3) The Twentieth Century Fund Task Force on Elementary and Secondary Education Policy report; (4) John Goodlad's study, sponsored by the Martha Holden Jennings and Kettering Foundations; and (5) Theodore Sizer's research, sponsored by the National Association of Secondary School Principals. It was commonly concluded that all students should be expected to achieve at their optimum level; that boards of education and school principals must take responsibility for school effectiveness and environment; and that student outcomes must be emphasized. Research identified five correlates of effective schools: institutional focus; school climate; instructional leadership; teacher expectations; and monitoring pupil progress. These factors were included in an achievement grid which was developed for field testing in public schools in Ohio. Other components included prior achievement, aptitude, anticipated and actual mastery, attendance, and student attitudes. A plan for conducting the field test was presented. A seven-page reference list concludes the report. (GDC)

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AN ACHIEVEMENT FORMULA THAT APPLIES THE CORRELATES OF EFFECTIVE SCHOOLS AND THE RECOMMENDATIONS OF THE "EXCELLENCE" REPORTS TO PREDICT, MONITOR, AND PROMOTE STUDENT ACHIEVEMENT

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A Paper Presented at
the Annual Meeting of
The American Education Research Association
April 1986

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TM 860 295

Statement of the Problem

One important hallmark of the early 1980s will be America's dissatisfaction with schools and schooling. Student achievement has declined remarkably, and since school effectiveness is determined by appropriate levels of student achievement, the credibility of the entire American educational system has become the object of national concern. According to President Reagan's Commission on a National Agenda for the 1980s, "the continued failure of America's schools to perform their traditional role adequately, together with a failure to respond to the emergency needs of the 1980s may have disastrous consequences for this nation" (Rodman, 1983, p. 1).

Group Studies

The eighteen-member National Commission on Excellence in Education, assembled by then Education Secretary Bell to examine the quality of American schools, released its dramatic report "A Nation at Risk" (Gardner, 1983). Among its discouraging pronouncements were that "the education foundations of our society are presently being eroded by a rising tide of mediocrity" (p. 3) and that schools have been "committing an act of unthinking, unilateral, educational disarmament" (p. 3). "For the first time in the history of our country," the report lamented, "the educational skills of one generation will not surpass, will not equal, will not even approach those of their parents" (p. 5).

Among the many specific indictments was that on nineteen academic achievement tests given in 21 nations, American students never finished first or second and were last seven times. From 1963 to 1980 Scholastic Aptitude Test (SAT) results in the United States fell

more than 50 points in verbal skills and 36 points in mathematics (Hunt, 1983). The Commission scorned American students' current rush to enroll in "less rigorous," more "relevant" subjects while enrollments in English, government, world civilization, algebra, and French experienced drastic declines.

The Excellence commission drafted a host of reforms for public schools:

1. There should be compulsory instruction in the "new basics" for all students, including four years of English, three each of science, mathematics, and social studies, one-half year of computer science, and two years of a foreign language for students planning to attend college.
2. Colleges should raise their admission standards to strengthen the preparedness of incoming students, and thus, force schools to upgrade their own expectations.
3. A series of standardized achievement tests should be established to certify student competence and determine remediation needed.
4. The school day and school year should be extended, and additional homework should be provided.
5. Higher academic standards should be established for admission to teacher education, as well as to qualify for final certification.
6. Salary, promotion, tenure, and retention decisions should be tied to an effective evaluation system that includes accountability for the instruction of identified skills.

7. Various incentives should be established to attract better teachers; career ladders and merit pay should be considered seriously to encourage master teacher status.
8. There should be increased opportunity for citizen involvement in the education program.
9. Greater focus must be placed on administrative leadership and direct involvement of principals in the instructional process.

Shortly after the Excellence Commission report, a second study was released by the Education Commission of the States, Task Force on Education for Economic Growth (Hunt, 1983). Citing the outcome of the National Assessment of Educational Programs for 1979, the Commission Task Force identified several disheartening statistics about the recent achievement levels of American students. Thirteen percent of the 17-year olds could not perform reading tasks considered minimal for functional literacy. Twenty-eight percent could not answer questions testing their literal comprehension of what they read. Fifty-three percent could not write a letter to correct a billing error, and only fifteen percent could write a persuasive statement.

The Commission of the States insisted that students will need more than minimum competencies in reading, mathematics, science, writing, and reasoning. It is imperative, they felt, that schools raise both the floor and ceiling of achievement. Students must improve their overall performance, particularly in the mastery of higher order skills. Districts must strengthen the curriculum and improve the management of schools to enable principals to concentrate on academic leadership. The major thesis of the report was that

"America's future success as a nation--the national defense, social stability and well-being, and the national prosperity--will depend on the school's ability to improve education and training. . ."(p. 11). The Commission felt it critical that before a student graduates he should possess the ability to learn and acquire new skills than enable him to be trained and retrained many times during his career. The Commission of the States made several action recommendations to improve the nation's schools, many of which were consistent with the suggestions of the Commission on Excellence.

1. Each state should establish its own plan for excellence in education.
2. Partnerships must be established between business and the schools to enlarge the base of economic and civic support for excellence in education.
3. Non-academic tasks currently performed by teachers should be done by non-certificated personnel to increase the amount of time teachers devote to student outcomes.
4. Teacher status, regard, and salary should be increased, and teachers should be more accountable for student achievement.
5. There must be an increase in the academic rigor of learning experiences so as to make them more intense and productive.
6. Schools must provide quality assurances of various outcomes (e.g., the measurement of teacher effectiveness, the establishment of learning objectives, frequent measures to certify competence, and provision for remediation).
7. School leadership and instructional management must be improved.

8. Schools must better serve underserved and unserved students, and extend to them equity, fairness, and equal opportunity.
9. The building principal should be responsible for the instructional program in each school; administrative salaries should be related to the effectiveness with which each individual performs his responsibilities.

A third national report on the quality of American education was released by the 20th Century Fund Task Force on Elementary and Secondary Education Policy (Wood, 1983). Consistent with the Commission on Excellence and the Commission of the States' recommendations, the 20th Century Fund study insisted that schooling must assure the availability of large numbers of skilled and capable individuals, without whom America cannot sustain its complex and competitive economy. This third report charged that the schools were overburdened with non-academic responsibilities and that the high regard for academic achievement once held by school staffs had given way to concern for wages, working conditions, and job security. The 20th Century Fund Task Force called for immediate federal intervention in school policy-making and implementation to re-establish and maintain educational equity nationwide. Citing previous federal enactments on behalf of education for the handicapped, bilingual education, and the creation of the Education Department, the committee insisted that the United States government mandate specific equity reforms and provide the funding necessary to support them. For example, special incentive grants should be awarded school districts to underwrite intervention projects for students failing to achieve.

Individual Projects

While the national committees and commissions deliberated, several individual researchers of considerable renown were finalizing their own studies of American schools. In his Paidea Proposal, Mortimer Adler (1982) had already criticized the curriculum in American schools as being in complete chaos--the plethora of electives was an abomination, and a common core of general education outcomes was non-existent. Ernest Boyer (1983), in his Carnegie-sponsored study of high schools, extended Adler's Paidea by insisting that schools re-establish a sense of mission and direction actualized by overall goals and objectives in an organized curriculum, articulated for grades K through 12. Students should first and foremost be competent in the use of oral and written language. At the high school level, a core curriculum consisting of two-thirds of the units required for graduation (rather than the current one-half) must be established. In the interest of life-long learning, Boyer felt education must engage in a mutual relationship with career and vocational areas. Boyer insisted that classroom instruction be significantly upgraded to include a variety of teaching styles (lecture, coaching, inquiry, etc.), that the student be involved as an active learner, and that tests and materials be criterion-referenced to identified objectives. Boyer also felt that the building principal should be the primary instructional leader of the curriculum and be responsible for upgrading achievement expectations and teacher training in each respective building.

Two of the most publicized reports by individual scholars were from John Goodlad (1983) and Theodore Sizer (1984). Sponsored by the

Martha Holden Jennings and Kettering Foundations, Goodlad conducted an eight-year study of the nation's schools which involved 43 researchers, 13 communities, and 27,000 interviews in 38 schools. Goodlad declared that American schools are "in trouble," deeply entrenched in the chronic problem of miseducation and in need of extensive restructuring (p. 26). Goodlad saw the classroom as a "world of talky teachers and uninterested students who work in a context of unclear goals and serious social and educational inequities" (p. 72). Large numbers of students were leaving school ill-prepared for jobs and effective citizenship. Goodlad's recommendations for improving schools included the following:

1. There must be a core of basic educational courses articulated for grades K-12.
2. Tracking should be abolished (heterogeneously-grouped classes performed more like high track students in content achievement, enthusiasm, and response to teacher expectations; the achievement levels in tracked classes sank to the lowest common denominator).
3. Schools need to reorder curriculum objectives; teachers must set forth and monitor clear expectations.
4. The time allocated to student learning should be a function of student aptitude, ability, and rate of learning.

Under the sponsorship of the National Association of Secondary School Principals, Theodore Sizer's (1984) research was conducted over a period of five years in 80 schools. In his committee's judgment, school requirements were far too minimal and should be raised considerably. Classroom procedures were characterized by bargains

struck between students and teachers not to expect too much. Sizer insisted that the focus of instruction be on ends or outcomes rather than means. Diplomas should be awarded on the basis of demonstrated competencies and performances. In Sizer's judgment, specifying the exact amounts of time each student has to learn is to presuppose that all students learn at the same rate and in the same increments. Sizer suggested more of a Mastery Learning (Bloom, 1974) approach to instruction. As with the other individual and group studies, Sizer's committee advocated substantial increases in curriculum requirements to upgrade the overall levels of student achievement, irrespective of ability.

Conclusions

The five studies mentioned and their ensuing reports draw many of the same conclusions about the serious weaknesses in American education and make several of the same recommendations about what must be done to remedy the situation.

1. Schools are not "off the hook" because of socio-economic status or previous learning deficiencies; all students are expected to achieve at their optimum level.
2. Boards of Education are responsible for the overall effectiveness of their schools; they must commit institutional resources and the organizational structure to certify student achievements; policies and procedures must be enacted, monitored, and evaluated.
3. The operational atmosphere in each district must reflect the board's commitment to raising levels of student achievement; the environment must be conducive to effective teaching and

learning; the overall attitude must be that school can and does make a difference.

4. School improvement will be unique to each building, necessitating strong instructional leadership by the principal to coordinate and monitor the various factors related to student achievement.

5. The educational program in American schools must be outcome-based rather than input-based (the traditional system of time spent and equal exposure); student outcomes must be carefully monitored and certified at the completion of each year in preparation for the next.

Relationship of Reform to Effective Schools

Educators gratefully acknowledge the criticisms leveled against American schools as a power source from which long-needed improvements can emanate. While recommendations made by the various commissions and individual researchers are warmly embraced throughout most of the profession, they represent a sort of deja vu--a throwback to the Effective Schools research of the mid 1970s. It is hardly coincidental that many of the "Reform" mandates are consistent with the correlates of Effective Schools identified by the research of Ron Edmonds and others. If the recommendations made by the "Reform" studies are perceived to be desired OUTCOMES or overall goals of successful schools, then the several correlates of Effective Schools can be considered ENABLERS or processers which lead districts to improved performance.

During a major study to validate the outcomes of the Effective Schools research sponsored by the Charles Stewart Mott Foundation,

Ross Zerchykov (1984) of the Boston-based Institute for Responsive Education identified the five correlates of effective schools. These five characteristics have been found in schools where student achievement levels are well above the norm and expectations are considerably higher than average. In Effective Schools, there was (a) an institutional focus on basic skills acquisition on the part of the students, (b) a school climate that was safe, orderly, and businesslike but not oppressive, (c) strong instructional leadership on the part of the principal, (d) the expectation that all pupils achieve a minimum mastery of basic skills, and (e) the practice of frequently monitoring pupil progress.

One qualifying thought about the Effective Schools correlates is that researchers do not yet know whether the five are actually causes of instructional effectiveness. Correlational research does not allow for drawing cause-effect conclusions, especially since the research is inductive or discovery-oriented. Care must be taken not to confuse ends with means; it is not the presence of the five correlates but pupil outcomes that define a school as effective. The five correlates describe practices that are means to an end; once the practices are established, changes must be documented to determine whether student achievement levels have improved, thus making the school effective. The five correlates serve as umbrella terms for accumulating evidence about practices associated with effective schools. In his summary of the Effective Schools movement for the Educational Research Service, Robinson (1985) suggested that school effectiveness resulted from concrete actions taken in response to the premise that students could and would learn. A final limitation of the Effective Schools research

is how schools become effective and stay effective in the context of enormous organizational, political, and economic pressures.

A "Formula" for Student Achievement?

Since schools are charged with the responsibility of educating American citizenry, and since "education" translates to demonstrable abilities, skills, knowledge, and values useful for successful adulthood, the onus of the "Reform" movement as well as the Effective Schools research has rightfully become student achievement. This is not to deny the many other social, psychological, and community-related outcomes of schooling. But the "acid test" of a school district's effectiveness is the achievement level of its students; how well its students score on college board tests, their Grade Point Averages (GPA), their skill levels in a chosen vocation, and their basic literacy and numerical skills are the standard by which the quality of their schools are determined. Unfortunately, an absolute formula for producing maximum student achievement is not available to schools. Formulae presuppose control of all variables, and the myriad of variables beyond the school's control make it impossible to say "doing X to a student under Y circumstances will always result in Z achievement." However, several efforts have been made to derive such a formula. Prior to both the Effective Schools research and the national "Reform" studies, Carroll (1963), Bloom (1974), and others attempted to set forth achievement formulae based on time or duration of instruction.

In 1963, James B. Carroll conducted an extensive study of learner behaviors to develop his Model of School Learning. Carroll observed that learners succeeded in given tasks to the extent they spent the

amounts of time needed to learn each task successfully. This "time needed" factor was a function of (a) each student's aptitude (higher aptitude students needing less time and lower aptitude students needing more time); (b) his prior learning (the net balance between accumulated skills and accumulated deficiencies); (c) his ability to understand instruction (a combination of general and verbal intelligence); and (d) the quality of instruction provided. Carroll interpreted "quality of instruction" as follows:

1. Lessons are presented using language that appropriately relates the concept being taught to the developmental levels of students.
2. "What" and "how" the student is to learn is set forth at the outset and frequently restated.
3. The learner is put into adequate contact with the material to be learned.
4. Each aspect of what is to be learned is presented in logical sequence and with necessary detail, with one step adequately prepared for by a previous step.
5. Instruction is adapted to the special needs and characteristics of the individual learner and accommodates his particular stage of learning.

In summary, Carroll's formula is as follows:

$$\text{Degree of School Learning} = \text{Function of } \frac{\text{time actually spent}}{\text{time needed}} \quad \text{(p. 730)}$$

"Time actually spent" is the lowest of the three variables: time <u>allowed</u>, time a student is <u>willing</u> to spend, and time <u>necessary</u> as determined by student aptitude. "Time needed" is derived by

adjustment for quality of instruction and the student's ability or intelligence. As the formula is applied, any of the factors found out of balance can be targeted as the possible cause(s) for failure to achieve.

A second achievement formula study was conducted by Benjamin Bloom in 1974. Comparing achievement of students in 48 states at the end of twelve years of school, Bloom found the difference between the mean achievement of students in the highest state and the mean in the lowest state was approximately one standard deviation on the national distribution of scores. The average student in the lowest state had achieved the equivalent of an eighth grade education after twelve years. "Accidents of birthplace and geography," declared Bloom, "determine that a student in one school may spend one and one-half school years to learn what students in another school will learn in one year" (p. 682). Bloom insisted that under mastery learning conditions, 80 percent of the students can achieve mastery at the same level as only the upper 20 percent of the students achieve in conventional learning situations. In Bloom's research, the slowest learners required approximately five times more time to reach mastery than did the fastest. Bloom contended that general aptitude or intelligence scores are valid predictors (with correlations ranging from .50 to .70) of the time required by an individual to master the material to criterion. This was especially true for earlier units in the learning sequence. Interestingly, better predictors for later units were the formative assessments utilized in determining the achievement levels in earlier units. Bloom's well-known Mastery Learning theory insists that with adequate time, assistance, and

motivation, 90 percent of the students will master identified objectives.

Two years later, a third study of achievement formulae was released by David Wiley and Mark Harnischfeger (1976). The Wiley-Harnischfeger model (hereafter referred to as W-H) discouraged the use of standardized achievement tests as the criterion for success because of the significant differences in curriculum covered throughout even the norming classrooms and the tremendous variety in amounts of time spent on individual objectives. Wiley and Harnischfeger felt that pupil achievement was directly determined by only two variables: the total time needed by an individual student and the total time he actually spends on a task. Similar to Carroll's, the W-H model distinguishes among total allocated time, the learning time needed by different students, and the amounts of allocated time actively spent. Quality of active learning time falls squarely on the shoulders of the classroom teacher in terms of classroom climate, organization and management of instruction, classroom strategies, the effective motivation of students, the active involvement of students in learning activities, and the level of teacher communication skills.

A fourth project with relevance to predicting achievement was the Beginning Teacher Evaluation Study (BTES) conducted in California in 1980. In that study, Fisher and Berliner (1980) referred to the ALT or Academic Learning Time as the amount of time a student spends actively engaged in a learning task he can perform with success. The match between a student's current knowledge and the task of the moment determines his level of success. In the BTES study, achievement gains

were the direct result of accumulated ALT. The most successful ALT intervals in the BTES were those characterized by the following teacher behaviors: diagnosis, prescription, presentation, constant monitoring, and continuous feedback.

In the same study, Barak Rosenshine (1980) admitted that "at present, we do not know what amount of time is necessary for most students to achieve, particularly the less academically successful student" (p. 112). Rosenshine suggested that teachers be assisted in the improvement of their methods of allocating time, specifically to increase student engaged time. Rosenshine's work was corroborated by Walter Borg (1980) during the BTES; he found a positive numeric correlation between student achievement and the amount of time teachers allocated to the instruction of specific content objectives.

One of the most recent studies on achievement formulae was that of Dale Mann and Deborah Inman (1984) sponsored by the School Finance Project of the National Institute for Education. Drawing on many of the pedagogical studies of achievement formulae (Carroll, 1963; Bloom, 1974; Fisher & Berliner, 1980), Mann and Inman (1981) sought to establish a formula from the perspective of cost-effectiveness--that is, how do student achievement outcomes justify the cost of schooling? In their production-function study, Mann and Inman attempted to specify how school inputs--specifically, the variables identified in the Effective Schools research--combine to produce achievement outcomes. The formula is as follows:

$$\underset{\text{(achievement)}}{A} = \underset{\text{(function of)}}{F} \quad \underset{\text{(input variables)}}{(X_1\ X_2\ X_3\ X_4\ X_5\ X_6)}$$

Variable X_1 is teacher characteristics and behavior, X_2 is administrator characteristics and behavior, X_3 is the description of

the student body, X_4 school climate, X_5 pupil evaluation, and X_6 curriculum materials. Among the corollaries of their findings, Mann and Inman (1981) stressed the need for overlap between what is taught and what is tested through curriculum mapping, test analyses, and attention to previous learning. Teacher expectations should be high but attainable and subject to careful, frequent scrutiny for needed modification and reinforcement. Assessments must be criterion-referenced to the content objectives being taught, a concept similar to Mastery Learning. The building principal should be more occupied with instructional leadership than with community relations or business management. The climate in effective schools should be one of expectation that all can and will learn. Norm-referenced testing must be reasonably aligned with the curriculum and be used appropriately before and after instruction to compare district achievement with national outcomes. Criterion-referenced testing must be utilized to formatively monitor achievement if diagnostic-prescriptive teaching is to result in increased achievement.

Mann and Inman (1981) proposed attaching weights to each variable and using a multiple regression analysis to determine the relative importance of each in promoting or retarding student achievement. These regression methods presume that output values can be represented as a weighted combination of input values and can be interpreted to explain the contribution each variable makes to outcome value. The Mann-Inman study revealed that schools can be instructionaly effective and, thereby, cost-effective within existing resources if the attitude and belief structure of those governing the schools so determines.

But What of Aptitude?

Conspicuous by its absence in both the Reform mandates and the Effective Schools correlates is the factor of student aptitude or measured ability and its causal effects on each child's level of achievement. Although aptitude is mentioned in the achievement formula studies, it is alluded to as a function of the time necessary for a student to learn a skill or complete a task rather than as a key determinant of the expected level of his achievement. While a child's measured aptitude should not be used to predetermine success or failure--denying him access to some programs and forcing him to be accelerated into others--actual practice has shown that it serves as a reasonably accurate predictor of the achievement that can be expected of a child at a given time in his development.

A Proposed Solution

In the two years since the Reform studies focused the nation's attention on the need for drastic changes in America's schools, the predicted groundswell of actual reform efforts resulting in improved student achievement has yet to materialize. Perhaps it is not so much that school districts are unwilling to initiate reform as it is that they are unsure about how to proceed and how to evaluate their efforts.

One solution may lie in the five correlates of the Effective Schools research. Moreover, the specific means of implementing the five correlates--that is, of relating them to student achievement--could be through an achievement formula, the application of which separates each of the five correlates as factors in achievement. Such a formula could serve not only to establish needed

reforms (or certify those already in place) but to formatively monitor and summatively evaluate the most significant desired outcome of the reform effort: improved student achievement.

THe balance of this paper consists of: (a) a review of the Effective Schools research to highlight specific attributes generalized to improved student achievement; (b) a proposed formula which attempts to combine the Effective Schools correlates and the most promising achievement models, with the added dimension of measured student aptitudes; and (c) a proposed means for field-testing such a formula first at four or five school sites in Ohio, and then in selected school sites throughout a tri-state area--Ohio, Pennsylvania, and Michigan--with districts currently involved in competency-based education (CBE).

Review of Selected Effective Schools Literature

Background of Effective Schools Research

Origins. The Effective Schools movement began as a quest to distinguish schools whose students achieved from schools whose students failed to achieve, irrespective of socio-economic status. Credited as the father of Effective Schools, Ron Edmonds (1978) described as effective those schools that bring children of the poor to the same achievement levels of children of the middle class. In essence, the percentage of students failing to achieve in effective schools is no greater among poor families than among middle and high income families. This principle of "proportional mastery" makes it impossible to predict levels of mastery and achievement on the basis of socio-economic status. In his summary of Effective Schools research, Ross Zerchykov (1984) described the movement as one yielding

research that shows what school practices can help "beat the [socio-economic] odds with respect to pupil achievement and pupil progress toward mastery of basic skills" (p. 11). Another major researcher in the Effective Schools movement, Larry Lezotte (1982), identified acceptable achievement for children of all socio-economic levels as mastery of those essential basic skills that are prerequisite to success at the next level of schooling. Expectations were not adjusted downward as a function of economic disadvantage.

If all students could be expected to achieve mastery, irrespective of socio-economic status, and if schools were responsible for enabling each child to do so, it would be necessary to re-examine the Coleman (1966), Jencks (1972), and Jensen (1969) studies of the late 1960s and early 1970s that insisted schools make very little difference in a child's life. These men and others had become convinced that socio-economic status and parent aspiration were the chief determinants of student achievement. In their judgment, the schools had virtually no real effect on student learning outcomes. During the research of Edmonds (1979), Brookover (1980, 1981), and Lezotte (1982, 1983), hundreds of schools were discovered nationwide where children of low socio-economic levels did in fact consistently achieve at acceptable levels. The Effective Schools research sought not so much to disprove the general connection between economic class and student achievement as to prevent educators from absolving themselves of all responsibility for student achievement on the grounds that socio-economic status infallibly predestined levels of achievement. The Effective Schools literature documented what was different about schools that did make a difference in student

achievement. Zerchykov (1984) queried whether the correlation between social class and student achievement was the result of "what lower class pupils are like. . . or of what schools serving lower class pupils are like" (p. 14). Are class differences in achievement the result of pupil characteristics as the social scientists insisted or of school characteristics as submitted by the Effective Schools researchers? The Effective Schools studies discovered significant variations in achievement among groups who statistically should have lower achievement levels. Such variations could be traced to practices of schools and schooling rather than student attributes.

Methodology. Methodologically, the Effective Schools studies have been widely criticized by so-called statistical purists suspicious of inductive research. Most research on learning outcomes seeks to isolate various factors affecting student achievement and then identify which are statistically the best predictors. By contrast, the Effective Schools research has been described by Lezotte (1983) as looking at instances of success and then describing what conditions were associated with that success. The analysis of data centers around a search for characteristics common among effective schools and absent in less effective comparison schools. Zerchykov (1984) felt the Effective Schools research sought to answer the question "what is different about successful schools that can be made to be different?" (p.15).

Seminal Studies. Considered one of the pioneers in Effective Schools research, George Weber (1971) found four urban elementary schools whose third grade reading achievement medians equaled or exceeded national norms, two in New York City and one each in Los

Angeles and Kansas City. Weber identified five characteristics common to all four schools in contrast to the other buildings in the same districts: (a) strong instructional leadership on the part of the building principal, (b) high expectations on the part of the teaching staff, (c) an orderly, safe school climate, (d) a deliberate and consistent focus on pupil acquisition of basic skills, and (e) consistent and legitimate reinforcement of student achievement through frequent evaluation of outcomes.

In a validation study of Weber's (1971) research, the New York State Office of Education (1974) compared two New York City schools that served similar populations but with dissimilar results. The same characteristics earlier described by Weber were found in the school whose students were achieving at or above the national norm.

In California (1975), twenty-one pairs of schools were matched on the basis of pupil performance on standardized achievement measures. One school in each pair had achievement levels at or near national norms; the other was not nearly as successful. In contrasting the successful schools with their unsuccessful counterparts, researchers discovered Weber's (1971) same five correlations. A similar study of fourth graders in Philadelphia (Kean et al., 1979) yielded the same results.

Edmonds and Frederickson (1978) studied sixth grade pupils in the Northeast sample of the Equality of Educational Opportunity survey. Using the traditional regression analysis, they tested an array of independent variables "corresponding to Weber's (1971) five factors" to determine which made a difference (and how much of a difference) on student achievement. Although all five of Weber's characteristics

were found to have measurable influence, "a deliberate and consistent focus on basic skills" was the most pervasive factor in each of the school settings.

In Great Britian, Michael Rutter et al. (1979) conducted a longitudinal study, in twelve London City schools, of ten-year olds as they progressed through three years of schooling. The factors distinguishing successful from unsuccessful schools were similar to Weber's (1971) characteristics:

1. There was more academic emphasis related to higher teacher expectations.
2. In classrooms, teachers remained on the topic more often; there were fewer interruptions, and classes began and ended on time.
3. Rewards and punishment were used effectively; praise was given to all students who deserved it.
4. More advanced planning and collaborative development of curriculum were completed by teachers.
5. While the age of the physical plant was of no real consequence, neatness--showing a sense of care--made a significant difference.

Several studies during the late 1970s and early 1980s have corroborated at least these five correlates. In an effort to actually use the correlates to bring about school improvement, replication projects emerged. Shoemaker (1982) reported that in 1982 there were at least five state departments of education engaged in School Improvement Projects: New Jersey, New York, Connecticut, Maryland, and Ohio. In the Huron Institute Survey, Miles (1983) found 2,378

individual schools in 875 districts in 25 states involved in 39 Effective Schools Projects.

Brookover (1981) and Lezotte (1983) proposed specific strategies for implementing the five correlates. Brookover suggested that boards of education begin by making an ideological commitment to school effectiveness as part of the district philosophy. Lezotte suggested actually publishing the district's philosophy on school effectiveness as a way of bringing it to public attention and enlisting community support. Secondly, according to both, districts should re-evaluate their social structure and remove tracking to discourage minimal expectations. Finally, Brookover insisted that districts carefully analyze instructional practices in terms of planning, delivery, and evaluation to identify specific areas of need. Lezotte added that principals may need specific retraining to become instructional leaders. Teachers may need to be trained to use student achievement data as a basis for program and student evaluation. Quality instruction is not coincidental or random; it can be identified and described as a common body of knowledge, replicable within a building or entire district.

Common Characteristics of Effective Schools

The KEDS Desegregation Assistance Center at Kent State University consolidated the most frequently-cited Effective Schools research into a series of procedures for establishing school effectiveness programs. In a pamphlet describing KEDS' services, Director Ben Turner (1983) annotated Weber's (1971) five correlates of Effective Schools.

1. Principals' Characteristics and Behavior. The principal:
    a. interprets the school mission to the staff;

b. provides guidance, support, and encouragement to students and staff;

c. serves as a communication link to parents and staff;

d. engages in continuous monitoring of pupil progress relative to the achievement of priority skills.

2. Teachers' Characteristics and Behavior. The teacher:

a. believes that all students can master the basic skills he or she is seeking to teach;

b. believes that he or she has the ability to provide the required instructional program;

c. makes substantial use of basic principles of learning and instruction.

3. School and Classroom Climate. The climate:

a. conveys a strong sense of academic mission;

b. includes high expectations which are conveyed to <u>all</u> students;

c. is conducive to effective classroom management through structured learning experiences;

d. allows for giving priority to academics as evidenced in increased amounts of allocated time;

e. permits maximizing academic engaged time (time-on-task).

4. Instructional Emphasis. The curriculum:

a. includes grade level objectives in reading, mathematics, and language arts;

b. provides for planning and monitoring for full content coverage.

5. Pupil Evaluation. Evaluation:

a. includes frequent assessment of student progress on a routine basis;

b. contains precise and informative report cards with emphasis on acquisition of basic school skills.

In the background section of A Nation at Risk, Miles (1983) alleged that the Effective Schools research actually prompted the Reform movement. In his study of the districts involved in 39 Effective Schools projects (2,378 schools in 875 districts in 25 states), Miles found that most involved the original five correlates, the application of which included (a) a system for extensive data collection and continuous feedback, (b) school-wide planning and teams and task forces, (c) technical assistance and consultation for program management, (d) intensive staff training and reinforcement, and (e) district (or alternative) funding to support initial development and annual recurring costs. Miles analyzed the similarities between what he termed the Excellence and Effectiveness programs. Each is a positive response to national criticism of education; each assumes that schools can do a better job. Each is concerned about student achievement; each has a "formula" for increasing school effectiveness by making schools more businesslike and orderly, and thereby intensifying the focus on academics and increasing student expectations.

The differences between the Excellence and Effectiveness programs identified by Miles (1983) are worthy of note but not irreconcilable. Excellence, focused on the high school level, dealt with higher-thinking and mastery of concepts above basic skills and spotlighted achievement among the best and brightest. The focus of

Effectiveness has been on the elementary level; efforts have centered on the basic skills, and the achievement emphasis has been for all students, irrespective of ability or socio-economic status. Excellence was based on a philosophical premise; the basis for Effectiveness was discovery research. Excellence showed the discrepancy between values about what should be and facts about what is; Effectiveness targeted what is possible. Excellence insisted on overall improvements; Effectiveness acknowledged that choices had to be made (e.g., should the limited resources be spent to provide tutoring services to all 3rd graders or to provide all 9th graders with computer literacy?). Both movements share one precarious footnote. As yet, there is no empirical evidence for either program that suggests reforms and practices will consistently result in improved achievement. Only time and continued study will assemble the necessary evidence.

Although most of the literature addresses five correlates of Effective Schools, a sixth correlate has been suggested by several studies: parent involvement or support. Although parent involvement should and has been an invaluable addition to instructional programs nationwide, Zerchykov (1984) stopped short of identifying it as a sixth correlate. "The nexus between economic class and achievement and class and levels of parent involvement makes it difficult to isolate the independent effects of participation on a school's achievement profile" (p. 26). Zerchykov found no studies which were able to disentangle the separate effects of class and participation on student achievement profiles.

Correlate #1: Institutional Focus

Nearly every major study on School Effectiveness paid special attention to institutional focus. In their review of 1,200 school effectiveness studies, Clark, Lotto, and McCarthy (1980) discovered that among the foremost success factors were instructional leaders who framed clearly stated goals for the entire district, set high achievement standards, and were entrepreneurial in procuring resources for teachers.

Clancy (1982) studied Michigan elementary schools and identified the nineteen which showed the greatest improvement in overall mathematics and reading test scores between 1976 and 1979. Two of the seven organizational factors attributed to their success were (a) a district superintendent who emphasized academic achievement and (b) expectations clearly understood by all district parties.

In their study of improving and declining schools, Brookover and Lezotte (1977) discovered that boards of education in improving schools placed significantly more emphasis on accomplishing basic reading and math goals and were more specific in their goals and objectives than were the declining schools. Lieberman and Miller (1981) analyzed three successful school effectiveness programs: the Concerns-Based Adoption Model, the Rand Change Agent Study, and the I/D/E/A-Kettering project. The foundation for all three programs was an organizational level commitment to the small details and the regular routines of daily practice. In studying fifty-two New Jersey public elementary schools to identify organizational factors that determine student achievement, Azumi and Madhere (1982) discovered that the more clearly teachers felt school goals were defined, the

higher the achievement levels were. Lezotte's (1983) definition of, institutional focus was the K-12 curriculum. Curriculum should be strong, well-defined, and uniform, to provide a systematic foundation for the measurement of pupil mastery.

In a production-function study of school effectiveness projects, Duckworth (1981) developed a conceptual paradigm to organize the evidence on teacher effectiveness and student achievement in terms of several levels. How students performed depended on a number of factors, including self-esteem, motivation, opportunities to learn, and various teacher attributes and behaviors. Much of what teachers did was determined by the support and direction received from the building principal. The extent to which the building principal influenced teachers to do the "right things" was, in part, a function of district-level administrative policy or institutional focus. The regulations formulated by district leaders were influenced by mandates from the community served. Finally, the extent to which the public brought pressure to bear on district leaders depended on the information it had about how district practices and policies could be applied to yield greater levels of student achievement.

Correlate #2: School Climate

In his summary of Effective Schools Research for the Educational Research Service, Glen Robinson (1985) identified the most frequently cited attributes of school climate in the literature. The climate in Effective Schools is characterized as follows:

1. Atmosphere is orderly and businesslike.
2. Discipline is consistent, fair, and firm.
3. There is a cooperative, congenial atmosphere.

4. There are few classroom interruptions.
5. Parents are positively involved in the learning process.
6. Relationships with the school community are positive.
7. Materials and facilities are adequate and accessible.
8. The physical plant is not necessarily new but always well-kept.

Lezotte's (1982) study of school climate revealed that the district's physical environment reflected the norms, beliefs, and attitudes held by its citizens about education. Those same norms and beliefs were ultimately manifested in student attitudes and achievement. Lezotte formulated seven dimensions of school learning climate:

1. The staff believes that all children can learn what is expected of them.
2. Teachers believe that students can learn what they can teach them.
3. The staff believes that schools exist to insure that students master basic cognitive skills and that resources are adequate to do so.
4. The staff is willing to forego some degree of autonomy to insure that individual efforts fit into the long-term, overall goals of the school.
5. Teachers are willing to look to their professional colleagues for advice, support, and guidance; they see themselves as part of an overall team working toward common purposes.

6. Teachers recognize the need for curricular and instructional coordination and support; they look to and expect the principal to be an instructional leader.
7. The atmosphere is extremely businesslike and conveys a sense of importance about the teaching and learning of essential skills.

Weber's (1971) research in four metropolitan schools interpreted climate as a "good atmosphere" with a sense of order, purpose, and pleasure in learning. Comer (1980) asserted that in a school climate of good interpersonal relationships and adequate teaching, all children will learn at expected grade levels.

Correlate #3: Instructional Leadership

One of the most frequently cited attributes of Effective Schools is the active presence of the principal as an effective instructional leader. Zerchykov (1984) summarized that instructional leadership is not a trait but a set of behaviors and previously acquired skills. It is neither dictatorial nor unassertive; it is nourished by a level of respect not imposed but created by a sense of followership. Effective instructional leadership cannot be legislated; it is inherent in what a person does and says. Lezotte (1983) suggested that principals in Effective Schools are active participants in the educational process; conduct frequent, helpful classroom observations; involve themselves directly with instruction; and offer proven viable alternatives for unsuccessful situations. In reviewing seven studies of the principal as an effective leader, Cotton and Savard (1980) identified three common characteristics:

1. He or she sets, communicates, and monitors reasonable expectations to the staff.
2. He or she conducts frequent and substantive classroom observations.
3. He or she actively participates in the instructional program.

Robinson listed nine attributes of successful instructional leadership culled from the Effective Schools literature. The effective principal: (a) plays an assertive instructional role; (b) is seriously goal- and task-oriented; (c) is well organized; (d) conveys high expectations to students and staff; (e) clearly defines and effectively communicates policies; (f) makes frequent classroom visits; (g) maintains high visibility and availability to students and staff; (h) provides strong, reliable support of teaching staff; and (i) is adept at parent and community relations.

Two qualifiers about the principal's leadership that consistently appear in the Effective Schools research have been the difficulty with time and support. Zerchykov (1984) insisted that principals cannot and should not be accountable for more effective leadership unless adequate time is provided. Austin (1979) concluded that a principal's effectiveness depends on the amount of support in time and training provided by higher level administrators and the board of education.

Several studies have focused on the importance of communication in the role of the effective principal. In their study of 52 Newark, New Jersey, elementary schools to determine student achievement, Azumi and Madhere (1982) discovered that schools with higher achievement were characterized by more communication between staff and principals and greater frequency of principal observations and evaluations.

Weber (1971) had identified strong instructional leadership as one of the deciding factors in the four effective urban schools. Gigliotti and Brookover (1975) discovered that principal expectations and teacher evaluations were positively correlated with student achievement. In the Philadelphia study of 245 variables that affect reading growth, it was determined that the more the principals observed in classrooms, the better the pupils achieved (Brookover, 1981). Brookover and Lezotte (1977) discovered that principals in improving schools were less "chummy" with staff members than were those in declining schools but more active in instructional leadership and discipline.

One other important role of the effective principal is in curriculum. In the California study (1977), principals in higher achieving schools had more years of experience, were perceived by teachers as more helpful and supportive, and had more of an influence on curriculum development than did their counterparts in the lower achieving schools. In the Clancy study (1982), the principal in each of the nineteen effective schools was a strong leader in the school and was knowledgeable about curricular and instructional matters.

Also in the California study (1977), principals in effective schools had greater influence and authority in hiring staff. Several studies revealed that the most effective principals had prior experiences as reading specialists. This was confirmed in the results of the Weber (1971), Clancy (1982), and Clark (1980) research, and the New York (1974) and Philadelphia (Brookover, 1981) studies. Two other studies focused on the importance of behavioral objectives in Effective Schools and the principal's responsibility in helping

teachers develop objectives. In a study for the American Educational Research Association on behavioral objectives, Melton (1981) discovered the importance of the principal in working with teachers on the proper use of objectives. Clancy's study resulted in similar findings about behavioral objectives and the building principal.

A final responsibility of the principal as instructional leader has to do with lesson planning. In a study of 5th grade mathematics classes, Carnahan (1980) discovered that students spent more time on-task when the teacher had planned and organized lessons well. Studies by Huit and Segars (1980), Talmage and Rasher (1978), and Clancy (1982), all studied the effects of diagnostic lesson planning, well-orchestrated among entire building staffs. From these and other studies, Zerchykov (1984) inferred that the more that short-term and long-term plans were disaggregated to account for the ability levels and learning styles of different pupils in a classroom, the more impact lesson-planning had on student achievement.

Instructional leadership, although usually associated with the building principal, is also the responsibility of curriculum consultants, program directors, and staff developers. In the Crandall et al. (1983) study, reference was made to instructional leadership as provided by a "constellation of players" (p. 19).

Correlate #4: Teacher Expectations

In his summary of the Effective Schools research, Zerchykov (1984) found that in the schools where student achievement levels were at or above national norms, the most apparent factor was that teachers expected their students to achieve. They had refused to accept the

early seventies convention that some children were so culturally or economically deprived that they would never catch up (p. 43).

In the Bookover & Lezotte (1977) study of declining and improving schools in Michigan, teachers in the declining schools spent less time on direct instruction and were less specific about instructional objectives because they had lower expectations for their students. When questioned, teachers and principals in the declining schools actually thought their students could not master basic skills. Teachers in improving schools were more specific about their instructional goals and objectives and spent more time in direct instruction. When questioned, staffs in the improving schools were actually dissatisfied with current levels of achievement; they felt students could perform at higher levels.

Robinson's (1985) summary of teacher expectations found in the Effective Schools research contended that staff members in less effective schools attributed the lack of student achievement to causes over which they had no control. Teachers in effective schools provided (a) goal-oriented instruction, (b) frequent assessment and monitoring of student achievement, (c) immediate feedback to students, (d) instruction appropriate to the developmental levels of students, (e) emphasis on the acquisition of basic skills, (f) continuity of instruction across grade levels, (g) effective instruction within heterogeneously grouped classrooms, and (h) effectively managed instructional time.

Brookover's study of secondary schools (1981) resulted in similar findings regarding teacher expectations. Teachers in the effective schools felt they could teach all their students without reliance on

outside specialists or removing "troublesome" students. Although effective teachers differentiated instruction in terms of individual needs, there was a concerted effort not to stratify or discriminate against less able students. The greater the difference in status among students, the less effective were the schools in Brookover's study. In their study of twenty Detroit schools, Edmonds and Frederickson (1978) discovered that teachers in the effective schools believed there should be a common standard for all students. Studies by Azumi and Madhere (1982) and Weber (1971) concur.

Gigliotti and Brookover (1975) discovered a high correlation between students' perceptions of parent and teacher expectations and the students' actual levels of achievement. There was also a high correlation among student achievement, the extent to which teachers pressed for increased achievement, and principal expectations of classroom teachers.

One interesting corollary to the teacher expectations research was the influence of teacher inservice on expectations of student achievement. Stallings (1980) divided teachers into two groups. Teachers in Group A were provided six workshops on teacher expectations and use of instructional time; Group B teachers were used as the control group and were not given workshop training. Students of the Group A teachers gained an average of six months more in measured reading achievement than did students of Group B teachers.

Some Effective Schools research provided information about specific teaching strategies. Huit and Segars (1980) reviewed major Effective Schools studies and identified four characteristics of teacher effectiveness:

1. Instruction was geared to individual considerations based on students' prior knowledge and learning style.
2. At least 60 percent of the skills and knowledge assessed by achievement tests were actually taught.
3. Appropriate amounts of time were allocated for learning; some students required more time than did others.
4. Students were provided with activities that generated moderate to high success in learning outcomes.

Lezotte's (1983) study found that effective teachers were good classroom managers, fostered greater student involvement and cooperation, and established a consistently productive working environment. The outcomes of these teaching practices included higher levels of student involvement; increased awareness on the part of students as to what is expected of them; relatively little wasted time, confusion, and disruption; and a work-oriented, yet relaxed, classroom atmosphere.

Madeline Hunter (1984) defined teaching as a process of making and implementing decisions before, during, and after instruction. Three assumptions made by effective teachers should be: (a) that every student has the potential for learning the next thing beyond that which he or she already knows, (b) that students learn at different rates and use different modes and strategies to learn, and (c) that students need different kinds of assistance and stimulation by the teacher at different points in time.

Zerchykov (1984) summarized strategy research by claiming there is no foolproof educational technology that works the same for all

students. "Pedagogic strategies that work for high ability students often do not benefit slow learners" (p. 36).

Six Effective Schools studies addressed teacher expectations in terms of behavioral objectives. Melton's (1981) research discussed placement of objectives in the lesson; Tursman (1981) referred to goals and objectives as academic "press." Clancy (1982) considered effective teacher expectations in the context of mastery learning. In the Brooklyn study, Levine and Stark (1982) advocated a district-wide list of essential skills, criterion-referenced tests to assess mastery, and diagnostic-prescriptive instruction. Brookover et al.'s (1980) study for ASCD recommended that teachers adhere to identified objectives in the basic skills, the humanities, sciences, and social sciences. Michael Cohen's research (1981) served as a reminder that the use of objectives should not be perceived as a "quick fix" merely to satisfy minimum competency testing requirements, nor should identified objectives be limited to basic skills and lower level learning.

Prior information about students had positive impact on teacher expectations. In a study of 5th grade mathematics classes, Carnahan (1980) found that the more information teachers had about their students' achievement and abilities, the more effective instruction they provided.

A final aspect of teacher expectations in the Effective Schools research is the timely use of praise. Lezotte (1982) insisted that effective teachers fostered positive feelings among students regarding their self-confidence and ability to learn. A one-time advocate of teacher praise, Brophy (1981) concluded that teacher praise had more

motivating effect on other students than it did on the recipient of the praise. Silversmith (1979) compared the effects of praise on young children with its effects on older children; he also studied the effects of criticism on student achievement. Young children responded well to praise; older children responded more to grades. The most effective feedback was minimal praise given for the task at hand. Criticism was correlated with low achievement. Rutter et al.'s study (1979) of effective London schools identified praise as a significant part of the teacher's repertoire. The Stallings (1980) study found that praise and support during the learning task were especially effective for low achieving students and that supportive and corrective activities were more effective than tasks involving silent reading and writing. Tursman's study (1981) found that teacher cues and feedback were among teaching behaviors that consistently made a difference in student outcomes. In their study of the correlation of self-confidence and praise, Beane, Lipka, and Ludewig (1980) discovered that consistent positive feedback was more effective than afew random compliments. Brookover's (1981) Philadelphia study revealed that study success depended on a relatively high self-concept and the feeling that one can succeed at schoolwork.

Correlate #5: Monitoring Pupil Progress

"With this variable," claimed Zerchykov, "there is a deceptive sense of the obvious." The key is to "monitor continuous progress, not just aggregate levels of achievement." Effective Schools have a longitudinal, data-based record of pupil progress "that is and isn't working" (p. 61). Robinson's (1985) summary of research identified several attributes of effective monitoring:

1. The monitoring is ongoing.
2. Progress is communicated to students, parents, and the community at large.
3. The effectiveness of the system is evaluated periodically.

In a review of monitoring systems from twenty-seven Effective Schools studies, Kash and Bouch (1982) found no best way to monitor progress. Immediate teacher feedback in response to current performance, however, was positively related to pupil achievement.

According to the California study (1977), Effective Schools made greater use of standardized tests than teacher-made tests for placement and evaluation purposes. The Clancy (1982) study found that Effective Schools utilized more diagnostic testing upon which performance objectives and progress measures were based. Purves and Levine (1975) studied school effectiveness in twenty-two countries. Among the principles discovered were that assessment is a normative process, that pupil performance on standardized measures is a reasonable indicator of academic ability and general intelligence, and that pupil characteristics both predict and delineate academic performance.

The results of the Beginning Teachers Evaluation Study (BTES) included the necessity of developing and using valid assessment if instruction were to be truly diagnostic-prescriptive. Lezotte's criteria (1982) for measurement of student achievement are that the assessments be locally rather than commercially developed, nationally validated, based on local curricular objectives, individually-referenced, and as objective as possible to eliminate the effects of teacher subjectivity.

The Proposed Formula

An Overview

Common sense suggests that the research on Effective Schools has confirmed that student achievement is not accidental or random. There are specific variables in school and schooling which, when systematically planned and carefully monitored, result in acceptable levels of student achievement. The purpose of an achievement formula is to combine the various factors that affect achievement for the purpose of producing desired results and, in the event of failure, identifying the factors responsible. An effective formula or scheme for predicting student achievement must provide for the major components of the Effective Schools research. By assembling available data, the formula should enable the user to determine whether the actual level of student achievement is consistent with the expected level and, if it is not, to pin-point possible reasons for the discrepancy. It is through the analysis of these reasons that school districts can provide needed intervention services.

If an achievement formula is to be useful and effective, it must be non-technical in its approach to school staffs, parents, and interested community representatives. While statistical treatments of data are essential for determining correlations among variables, the formal operations must be computerized so that they are relatively automatic. Otherwise, building administrators and teachers will be easily intimidated by and discouraged from using the system. Printouts must be simple, direct, and easily generated at several intervals throughout the year. The computer must be capable of correlating any one (or a number of) variable(s) with another or

others depending on specific teacher, building, or district needs for information.

Information for the system must be easily accessible and already available to districts and must be gathered routinely and uniformly. Collecting special information on selected students would involve singling some students out from others and represents additional expenditures of time and money. Standardized achievement and aptitude test scores are obtained each year at selected grade levels. Pupil attendance is routinely documented. Evaluations of classroom performance are conducted frequently on all teachers, thus making information on instructional activities readily available. Individual classroom tests are routinely available for scrutiny by parents, the building principal, or other teachers. Essentially, the success of any achievement formula depends on the extent to which it can be utilized with data that have already been obtained and the extent to which it assesses all students and teachers rather than singling out a select few. To be sure, no database is foolproof, and it may be necessary to obtain additional information on a small percentage of students.

A successful achievement formula must contain information that is both pertinent to student achievement and helpful in providing intervention or remediation of skills not learned. Drawing from the Effective Schools research, the following information should be considered: (a) prior level of student achievement and accumulated deficiencies, (b) current level of measured aptitude, (c) anticipated level of achievement following a year of instruction, (d) actual current level of student achievement, (e) the discrepancy between a

student's anticipated and actual levels of achievement, (f) pupil attendance (days present compared to days expected), (g) pupil attitude, (h) the quality of instruction, (i) teacher expectations, (j) institutional goals and objectives, (k) school climate factors, and (l) evidence of instructional leadership.

The proposed formula itself is actually an achievement grid that displays the twelve correlates associated with student achievement. Further analysis of each correlate will identify specific factors or applications. (See Figure 1.) When it is presented to the classroom teacher in the fall, the grid contains the names of his or her class, and the prior achievement level (column 1), aptitude (column 2), and anticipated level of achievement (column 3) for each student. As the school year progresses, the remaining information is collected and the grid updated. At the end of the instructional year, the actual level of student achievement (column 4) is determined, and the comparison between each student's anticipated and actual level of achievement will determine whether there is a discrepancy between the two. If the student has achieved at a level less than anticipated, a minus will appear in column 5. If he has achieved at a level greater than anticipated, a plus will appear. If his achievement is at or near expected levels no mark will appear. For students receiving no mark, the inference is that the remaining ten correlates were effectively applied. For students receiving a plus, the inference is that the other ten correlates have been extremely effective and that he should be considered for acceleration. Further analysis of specific correlates will factor out those conditions and strategies responsible for his success to enable replication in similar cases. For students

Figure 1

CLASS ACHIEVEMENT GRID

DISTRICT: _____ DATE: _____

SUBJECT: _____ SCHOOL YEAR: _____ TEACHER: _____

	ACHIEVEMENT LEVELS					CORRELATES	
NAME (or I. D. #)	(1) PRIOR LEVEL OF ACH'T % of PPO's MASTERED LAST YEAR	(2) APTITUDE (STANDARD RANGES)	(3) ANTICI-PATED LEVEL OF ACH'T % of PPOs SHOULD M'R	(4) ACTUAL LEVEL OF ACH'T % of PPOs ACTUALLY MASTERED	(5) DISCREP-ANCY BETWEEN ANTICIP'D & ACTUALLY MASTERED (+, -)	(6) PUPIL ATTEND. DAYS PRESENT/ DAYS EXPECTED	(7) PUPIL ATTITUDE p-positive I-indiff't N-neutral
etc.							

QUALITY OF ISNTRUCTION (✓ = DEMONSTRATED)

- __lessons plans
- __objectives set forth
- __pre-assessment
- __learning modality
- __learning style
- __appropriate language (examples, explanations)
- __criterion-referenced post-tests (specific to PPO's)
- __intervention

TEACHER EXPECTATIONS (✓ = DEMONSTRATED)

RESPONSE OPPORTUNITIES	FEEDBACK	PERSONAL REGARD
__equitable distribution of response opportunities	__affirm or correct students' performance	__proximity
__individual helping	__parise of	__courtesy
__latency (wait	__listening	__compliments
__delving	__reasons for praise	__touching
__status roles	__desists	__personal interest
__high level questioning	__building on ideas	__accepting
		__accepting feelings

(10) INSTITUTIONAL GOALS/OBJECTIVES (✓ = APPARENT)

- __board commitment to student achievement as primary purpose of educational program
- __board-adopted plan for compliance with new standards
  - __adopted courses of study (C.O.S.)
  - __adopted pupil performance objectives (PPO's)
  - __adopted system of assessment
  - __adopted systems for intervention
  - __adequate, effective record-keeping
- __materials/equipment adequate to support C.O.S.
- __access of handicapped children to CBE
- __effective promotion/retention policy
- __adequate inservice training

(11) SCHOOL CLIMATE (✓ = EXISTS)

- __physical plant well-maintained
- __accessibility of materials/equipment
- __safe, orderly environment
- __discipline is fair, firm, consistent
- __positive support by community
- __positive input by parents
- __business-like atmosphere (order, system)
- __sense of shared commitment to student achievement: staff expectations that students can and will succeed
- __few class interruptions
- __interstaff cooperation, mutual respect/support for total building effort

(12) INSTRUCTIONAL LEADERSHIP (✓ = DEMONSTRATED)

- __high expectations of students and staff established and communicated
- __goal/task-orientation, commitment
- __knowledgeable about curriculum
- __leads instructional program; maintains direct involvement
- __regular (several times yearly) classroom observations
- __appraises instruction accurately, adequately; makes viable suggestions for improvements/alternatives
- __effective community relations
- __works well with parents
- __encourages/accepts staff input in decision-making
- __makes timely, effecive decisions
- __delegates responsibilities and facilitates accomplishment thereof
- __high degree of visibility
- __operates/behaves consistently
- __effecitvely mediates among teachers
- __policies/procedures clearly established, followed
- __maintains effective distance
- __provides encouragement, support, when needed
- __is -self-motivated; values professional growth, healthy self-esteem

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receiving a minus, the inference is that one or several of the ten correlates has been improperly applied. Further analysis of these correlates will determine what specific factors, or absence thereof, may have been responsible for the discrepancy.

Specific Correlates

#1: Prior Levels of Achievement. Since student achievement is developmental, no one grade level is mutually exclusive of the other. The accomplishment of identified skills, knowledge, and attitudes in any one year is conditional in large part on the accomplishments (or lack thereof) from previous years. Column 1 will contain a percentage of Pupil Performance Objectives (PPOs) mastered for the year before. An addendum to the Achievement Grid will be an Accumulated Deficiencies Profile (see Figure 2) for each pupil that lists the PPOs the student has not yet mastered in each subject and at each grade level. The actual level of achievement (column 4) will reflect necessary adjustments for serious deficiency levels that the teacher may need to spend instructional time remedying.

#2: Aptitude. Most school districts include an aptitude test or test of general ability in their program of standardized testing to compare attained levels of achievement with expected levels. McGraw-Hill, for example, correlates the Test of Cognitive Skills (an achievement test). The aptitude score should be recorded as a two- or three-digit number, similar to an I.Q., with scores ranging from 90 through 110 considered average.

#3: Anticipated Level of Achievement. If a student has relatively few accumulated deficiencies (interpreted as having mastered at least 75 percent of last year's PPOs) and an aptitude

Figure 2

(SAMPLE)

ANY LOCAL SCHOOL DISTRICT
REPORT OF ACCUMULATED DEFICIENCIES

STUDENT_____ PRESENT GRADE 9th BUIDLING_____ DATE_____

___K-4 ___5-8 ___9-12

GRADE 5

MATH	SCIENCE	SOCIAL STS	ENGLISH	HEALTH	PHYS ED	ART

GRADE 6

MATH	SCIENCE	SOCIAL STS	ENGLISH	HEALTH	PHYS ED	ART

GRADE 7

MATH	SCIENCE	SOCIAL STS	ENGLISH	HEALTH	PHYS ED	ART

GRADE 8

MATH	SCIENCE	SOCIAL STS	ENGLISH	HEALTH	PHYS ED	ART

score at least within the range of 90-110, it is reasonable to expect him to achieve at least 75 percent of this year's PPOs. Similary, if his prior level of achievement falls within the range of 90 to 100 percent and his aptitude is over 120, he could be expected to achieve nearly 100 percent of this year's PPOs. A student whose aptitude is below 90 is likely to have a significant number of accumulated deficiencies. His expected achievement level may well be less than 40 percent of the grade level PPOs, especially since the teacher might be spending considerable time on deficiencies.

To be sure, some interesting discrepancies will occur. There will be students who have mastered less than 40 percent of last year's PPOs who have aptitude measures well above the average range; conversely, some students will have below average aptitude scores while having mastered over 80 percent of last year's PPOs. Students in these categories will merit closer scrutiny as the process continues. Whatever the outcome of columns 1 and 2, column 3 represents the general level of percentage of PPOs that it is reasonable to expect each student to achieve by the year's end.

#4: Actual Level of Achievement. As the year progresses classroom teachers will monitor student achievement on PPOs using various criterion-referenced assessments, some paper-pencil and some observational. At the conclusion of instruction, the teacher will determine the percentage of PPOs actually mastered. Although a standardized test could be used to determine achievement levels, it measures achievement at only one point in time and does not credit students with skills that might be mastered the next day or could be demonstrated in a non-paper-pencil mode. It is preferable that

teachers employ several measures to assess PPOs and thus afford students as many opportunities and channels to demonstrate mastery as possible.

#5: Discrepancy Between Anticipated and Actual Mastery. The comparison between each student's anticipated and actual levels of mastery will reveal his current learning status. The percentage of PPOs actually mastered should be at or near the percentage anticipated. A plus would indicate mastery above the expected level and demonstrate the possible need for enrichment. A minus would indicate achievement below the expected level and demonstrate the need for intervention. No mark in column 5 would indicate that the actual level of achievement is fairly consistent with the expected level. It is at this point, the determining of discrepancies between actual and expected achievement, that correlates six through twelve will be applied to ascertain which variables or factors of school or schooling might have been responsible for the discrepancy in achievement.

#6: Pupil Attendance. One of the most important but often ignored issues relative to performance outcomes is attendance. In considering possible causes for lower-than-expected levels of achievement, educators should not overlook the fact that students cannot benefit from instruction when they are absent. At any point during the year, column 6 can reveal the ratio of days present to days expected.

#7: Pupil Attitude. How students feel about school, about themselves, and about their effectiveness as learners is directly correlated to their level of achievement. The classroom teacher is in the ideal position to monitor student attitude on an ongoing basis.

Naturally, an individual student's attitudes will fluctuate due to various internal and external circumstances throughout the year. The teacher should identify the overall attitude of each student, exclusive of occasional extremes, as positive, negative, or neutral. While there is no numerical coefficient for attitude, a negative attitude will undoubtedly contribute to lower levels of achievement and will certainly represent a target for remediation. If a district prefers, several instruments which have been developed to assess student attitude and a system of numerical weights can be used in place of teacher judgment.

#8: Quality of Instruction. Quality of instruction is defined as the effectiveness of classroom teaching practices. Unfortunately, even strategies that have consistently proven successful are no more effective than the capability of the individual teacher. Although each school district should identify its own particular standards for quality of instruction, several criteria have consistently emerged in the Effective Schools research as particularly germane to diagnostic-prescriptive teaching. For use in Ohio school districts, the proposed Achievement Grid incorporates criteria from both the Effective Schools research and the teaching requirements found in the minimum standards promulgated by the Ohio Board of Education. These are:

1. Lesson plans should reflect the graded course of study, contain the various components as adopted by the Board of Education (e.g., strategies, materials, activities), and represent thorough systematic treatment of subject matter from both a short-run and long-term perspective.

2. Unit, chapter, and/or lesson objectives should be clearly identified for students; teaching strategies and classroom activities must be clearly referenced to stated objectives.
3. Teachers should consistently pretest students (informally as well as formally) to determine prior knowledge and any particular deficiencies relevant to stated objectives.
4. Lessons should contain activities varying in modality and learning style.
5. Classroom language should be appropriate to the developmental level of the student; explanations, metaphors, and illustrations must be consistent with the sense or logic of the topic under consideration.
6. Teachers should administer criterion-referenced post-tests to assess student mastery of stated objectives or PPOs; tests may be paper-pencil or non-paper-pencil but must reflect the conventions of construction and content.
7. Intervention and remediation must be provided for students failing to achieve mastery or needing acceleration; lessons should reflect enough flexibility to allow for spontaneous intervention.

As instructional leader, the building principal will incorporate the above criteria into his instructional expectations and utilize them in his classroom observations and teacher evaluations. The Quality of Instruction correlate should be posted on the spring edition of the Achievement Grid to reflect the presence or absence of specific factors that may have contributed to student achievement for that year.

#9: Teacher Expectations. Although there are several packages and models of teacher expectations that have received considerable attention, one particular system that is consistent with the Effective Schools research is Teacher Expectations for Student Achievement (Kerman, 1979) or T.E.S.A. As part of his instructional expectations and classroom evaluations, the building principal should observe the presence and/or absence of the T.E.S.A. interactions, listed below.

Strand A: Response Opportunities. The teacher:

1. demonstrates equitable distribution of response opportunities;
2. provides individual help;
3. makes use of latency (wait time);
4. uses delving techniques;
5. is aware of status roles;
6. encourages high level questioning.

Strand B: Feedback. The teacher:

1. affirms or corrects students' performance;
2. praises learning performance;
3. listens attentively;
4. provides reasons for praise;
5. makes effective use of "desist";
6. legitimately builds on ideas.

Strand C: Personal Regard. The teacher:

1. stands and sits in proximity to students;
2. demonstrates courtesy;
3. compliments students sincerely;
4. touches students;

5. demonstrates personal interest in students;

6. exhibits accepting feelings.

The Teacher Expectations correlate appears on the Achievement Grid to reflect the presence or absence of specific factors that may have contributed to student achievement for that year.

The final three Effective Schools characteristics to appear on the Achievement Grid for correlation with student achievement are Institutional Goals, School Climate, and Instructional Leadership. While the building principal determines the presence or absence of Quality of Instruction and Teacher Expectations, the classroom teacher is the one to determine the extent to which he actually realizes the support from the administration, the principal, and the rest of the staff. One approach would be to have teachers complete a three-part checklist (corresponding to the final three correlates) in the fall to serve as a needs assessment for the administration. A similar checklist completed in the spring would determine specific improvements in support made during the course of the year. Having the classroom teacher provide information on instructional support and the building principal provide information on instructional services lends an effective check-and-balance to the application of the final three correlates. Any discrepancies in perception could be reconciled through a process of negotiation that in itself will serve as an important function in upgrading instructional services. The specific factors in each of the three final correlates were culled from the research on Effective Schools and from the implied directives of the Ohio minimum standards for educational institutions.

#10: Institutional Goals and Objectives

a. There is a Board commitment to student achievement as the primary purpose of the educational program.

b. There is a Board-adopted plan for compliance with state standards, as evidenced by:

1. adopted courses of study
2. adopted pupil performance objectives (PPOs)
3. adopted system of assessment
4. adopted system for intervention
5. adequate, effective record-keeping

c. Materials and equipment are adequate to support the courses of study.

d. Handicapped children have been provided access to CBE.

e. There is an effective promotion and retention policy in place.

f. Inservice training is adequate.

#11: School Climate

a. The physical plant is well-maintained.

b. Materials/equipment are readily accessible and in good working order.

c. The environment is safe and orderly.

d. The discipline is fair, firm, and consistent.

e. The school enjoys positive support by the community.

f. There is positive input by parents.

g. There is a businesslike atmosphere in the daily operation of the building.

h. There is a sense of shared commitment to student achievement; the staff expectations are that students can and will succeed.

i. There are few class interruptions.

j. There is inter-staff cooperation, mutual respect, and support for total building effort.

#12: Instructional Leadership. The principal:

a. Establishes and communications high expectations for students and staff.

b. Has an effective goal/task-orientation; demonstrates commitment.

c. Is knowledgeable about curriculum.

d. Leads the instructional program; maintains direct involvement.

e. Conducts regular (several times yearly) classroom observations.

f. Appraises instruction accurately, adequately; makes viable suggestions for improvements/alternatives.

g. Maintains effective community relations.

h. Works well with parents.

i. Encourages/accepts staff input in decision-making.

j. Makes timely, effective decisions.

k. Delegates responsibilities and facilitates accomplishment thereof.

l. Maintains a high degree of visibility.

m. Effectively mediates among teachers.

n. Follows clearly established policies/procedures.

o. Maintains an effective distance.

p. Provides encouragement and support when needed.

q. Is self-motivated; values professional growth in himself and others.

The proposed Achievement Grid should provide an effective format for processing relevant information about student achievement. Through the application of each respective item of information in correlation with the other items, student achievement can be examined in the light of those correlates having the most direct bearing on school outcomes.

Proposed Field Test

Simply adopting policies and developing procedures to implement the Effective Schools correlates in no way guarantees improved student achievement. Steps must be taken to carefully incorporate the literal operation of each correlate into the daily, weekly, and monthly school routine. The correlates must be singly and collectively evaluated at intervals throughout the year and adjusted as necessary. Naturally, the use of the Achievement Grid will involve considerable teacher inservice, principal retraining, and the establishment of or access to a computerized instructional management system. Information charted on the Grid may identify the need for considerable revision of existing practices. It may also be revealed that other practices are already in place or need only slight modification.

It is proposed that the Grid be field-tested in four or five Ohio school districts. Included would be the entire inservice training necessary for its implementation. Specifically, an attempt would be made to involve districts already committed to outcome-based education

or Competency-Based Education as prescribed in the minimum standards for Ohio schools.

Plan of Operation

The steps in the operational plan, the personnel who will be involved in the delivery of the service and those who will be monitoring that delivery of service are as follows:

Activity	Personnel Delivering the Service or Engaging in the Activity	Personnel Monitoring Delivery of Service
1. Obtain the formal commitment of those school districts in Columbiana County that have indicated initial agreement to participate in the project.	1. Columbiana County District Office personnel, under the direction of Dr. Judith March.	1. Kent State University personnel, under the direction of Dr. Pat E. Crisci.
2. Plan the inservice training that will be needed (see narrative for details) by the principals and teachers who will be a part of the first phase of the field testing (for the completion of column 7 and the responses to items 8, 9, 10, 11, & 12).	2. Columbiana County District Office personnel, participating principals and teachers, and selective university personnel.	2. Kent State Univ. Personnel not involved in the inservice training.
3. Provide the inservice to the principals and teachers.	3. Columbiana County District Office personnel and university faculty.	3. Same as above.
4. Train the data collectors to record the information needed in columns 1, 2, & 3 of the Achievement grid (see narrative) at the beginning of the school year and in columns 4, 5, & 6 at the end of the year.	4. Columbiana County District Office personnel.	4. Same as above.
5. Collect the information and data.	5. Columbiana County District Office personnel.	5. Kent State Univ. personnel.
6. Evaluate the efficacy of the inservice training provided.	6. Columbiana County District Office personnel and university personnel.	6. Kent State Univ. personnel not directly involved in the evaluation.
7. Revise or modify the in-service according to the results of the evaluation of participating parties.	7. Same as above.	7. Same as above.
8. Initiate contact with selected school districts in other parts of Ohio and in Pennsylvania and Michigan that have a competency-based student achievement policy and invite their participation in the second phase of field testing.	8. Same as above.	8. Same as above.

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9. Provide the inservice for the principals, teachers, and data collectors in the phase two field testing.	9. Columbiana County District personnel, university faculty, and other trained personnel as needed in other states.	9. Same as above.
10. Collect data and information, as done in phase one, and record same.	10. District and university personnel.	10. Same as above.
11. Follow same steps as in the phase one field testing.	11. Same personnel as indicated in the phase one field testing.	11. Same as above.
12. Provide feedback to all the principals, teachers and other personnel who were involved in both phases one and two of the field testing about those students identified by the process (on the grid) who need intervention and in what area it is needed.	12. Columbiana County District office personnel, key personnel in other cooperating districts, and university personnel.	12. Same as above.
13. Evaluate project and formula to determine its efficacy for future use.	13. Same as above.	13. Same as above.
14. Disseminate information through presentations at appropriate national and regional meetings and through journal articles and newsletters.	14. District and university personnel.	14. District and university personnel.

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